

DEVELOPMENT OF A FIXED SPRAYING STRUCTURE FOR HIGH-DENSITY APPLE PLANTINGS FINAL REPORT 1997

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ABSTRACT

A configuration of microsprinkler nozzles and supply tubing was fixed onto the support system of a high-density Red Delicious apple planting to evaluate its efficacy in applying sprays in small plots, as compared with a standard airblast sprayer. Efficacy in control of plum curculio with two sprays of azinphosmethyl, and of mites with one spray of abamectin using this system was equal to that obtained with airblast applications. A chelated iron spray was applied in July to assess spray deposit and canopy distribution patterns. Foliar analysis showed spray deposition equivalent or superior to that of an airblast sprayer. A fixed system might overcome many intrinsic inefficiencies of airblast sprayers and promote lower use rates or least-toxic materials with shorter periods of residual effectiveness.

INTRODUCTION

Many of the problems associated with poor pest control and environmental contamination have been linked to poor pesticide spray application (both over- and under-spraying). Although the tree-row volume method can improve the efficiency of the spray application, other inherent shortcomings of the process need to be addressed. Conventional airblast orchard sprayers use a turbulent airstream to displace the air in the canopy and replace it with air containing a suspension of pesticide solution droplets. The general inefficiency of this process requires that an excess of spray solution be applied, and a large proportion of the dose sprayed consequently fails to reach its target, being lost to drift and run-off. Additional problems arise because the distribution of pesticide deposited in the canopy of most trees is normally non-uniform, with higher deposits in sites closer to the sprayer.

The development and gradual adoption of newer tree forms, such as trellis and high density small trees, presents an opportunity to reduce chemical application rates and improve delivery of the spray to the target site. In trees of a reduced size (girth) and having a profile that is largely predetermined and limited, it should be possible to incorporate into the planting system's support structure a fixed arrangement of tubing and spray nozzles that is capable of contacting the top and sides of each tree with a spray that could be maintained for just long enough to completely cover all canopy surfaces.

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